1. An implant comprising a surface adapted for attachment to tissue, the surface comprising a semiconductor oxide, wherein the semiconductor oxide has an average pore size of no more than 10 um and a thickness of at least 0.2 um.

2. The implant of claim 1, wherein the semiconductor oxide comprises titania.

3. The implant of claim 1, wherein the semiconductor oxide has a porosity of less than 10%.

4. The implant of claim 1, wherein the semiconductor oxide is adapted to be a wave guide transmissive to light.

5. The implant of claim 4, wherein the wave guide has a porosity suitable for delivering fluids.

6. The implant of claim 4, wherein the implant further comprises a light port for receiving a light signal, that is coupled to the semiconductor oxide.

7. The implant of claim 4, wherein the wave guide has an outer surface, and wherein the implant further comprises a reflective layer at the outer surface of the wave guide.

8. The implant of claim 1, wherein semiconductor oxide is a composite comprising the semiconductor oxide and a light transmissive material.

9. The implant of claim 1, wherein the semiconductor oxide is titania, and is implanted with vanadium ions.

10. The implant of claim 1 wherein implant comprises a titanium-containing base material, and the semiconductor oxide is titania .

11. An implant comprising a titanium bulk material having an oxidized outer surface forming an oxidized layer, wherein the oxidized layer has a thickness of at least 0.2 um.

12. The implant of claim 11, wherein the oxidized layer has an outer surface, and wherein the implant further comprises a reflective layer attached to the outer surface of the oxidized layer.

13. The implant of claim 11, wherein the semiconductor oxide is titania and is doped.

14. The implant of claim 11, wherein the titanium bulk material has a porosity defining a porous scaffold suitable for bony ingrowth.

15. An implant comprising:

a base material having an outer surface;

a wave guide comprising an inner surface and an outer surface, wherein the inner surface of the wave guide is disposed adjacent the outer surface of the base material; and

a photocatalytic layer comprising a semiconductor oxide having an inner surface, wherein the inner surface of the photocatalytic layer is disposed adjacent the outer surface of the wave guide.

16. The implant of claim 15, wherein the wave guide comprises a material selected from the group consisting of alumina, silica, CaF, titania, single crystal-sapphire, polyurethane, epoxy, polycarbonate, nitrocellulose, polystyrene, PCHMA.

17. The implant of claim 15, wherein the photocatalytic layer comprises titania.

18. The implant of claim 15, wherein the photocatalytic layer comprises a porous scaffold suitable for bony ingrowth.

19. The implant of claim 18, wherein the photocatalytic layer further comprises a UV transmissive material.

20. The implant of claim 15, wherein the wave guide comprises a light port adapted for receiving a light signal.

21. The implant of claim 15, further comprising a reflective layer disposed upon the photocatalytic layer.

22. The implant of claim 15, wherein the semiconductor oxide is doped.

23. An implant comprising;

a base material having an outer surface,

a wave guide comprising an inner surface, wherein the inner surface of the wave guide is disposed adjacent the outer surface of the base material; and

a light port coupled to the waveguide and adapted to receiving a light signal.

24. The implant of claim 23, wherein the light port has a concave surface adapted for entry of a first end of a fiber optic cable.

25. The implant of claim 23, wherein the light port has a seal spanning the concave surface.

26. The implant of claim 23 further comprising a fluid port coupled to the waveguide and adapted for receiving a distal end of a cannula.

27. The implant of claim 26, wherein the wave guide has a porosity suitable for delivering fluids.

28. An implant comprising a photocatalytic layer comprising a semiconductor oxide having an outer surface, wherein the outer surface of the semiconductor oxide is doped.

29. The implant of claim 28, wherein the dopant comprises an ion-implanted metal.

30. The implant of claim 29, wherein the metal is selected from the group consisting of vanadium and chromium.

31. The implant of claim 28, wherein the dopant comprises nitrogen.

32. The implant of claim 28, wherein the dopant is selected from the group consisting of Nd^{+3}, Pd^{+2}, Pt^{+4} and Fe^{+3}.

33. The implant of claim 28, wherein the semiconductor oxide is titania.

34. The implant of claim 33, wherein the titania is a bulk layer.

35. The implant of claim 33, wherein the titania is an oxidized layer overlying titanium.

36. An implant comprising a semiconductor oxide having an outer surface, wherein the semiconductor outer surface has a light absorption maximum at a wavelength of at least 400 nm.

37. The implant of claim 36, wherein the semiconductor oxide comprises titania.

38. The implant of claim 37, wherein at least the outer surface of the titania is doped.

39. The implant of claim 38, wherein the dopant comprises an ion-implanted metal.

40. The implant of claim 39, wherein the metal is selected from the group consisting of vanadium and chromium.

41. The implant of claim 38, wherein the dopant comprises nitrogen.

42. The implant of claim 38, wherein the dopant is selected from the group consisting of Nd^{+3}, Pd^{+2}, Pt^{+4} and Fe^{+3}.

43. The implant of claim 36, wherein the outer surface is porous.

44. The implant of claim 36, wherein the semiconductor oxide is a composite layer including a waveguide.

45. The implant of claim 44, further comprising a reflective layer disposed upon the composite layer.

46. An implant comprising:

a base material having an outer surface;

a semiconductor oxide comprising an inner surface and an outer surface, wherein the inner surface of the semiconductor oxide is disposed adjacent the outer surface of the base material; and

a reflective material having an inner surface, wherein the inner surface of the reflective material is disposed upon the outer surface of the semiconductor oxide.

47. An implant comprising a composite material comprising:

a first material having a transmissivity of at least 50% when exposed to a predetermined wavelength of light; and

a second material having photocatalytic activity when exposed to the predetermined wavelength of light.

48. The implant of claim 47, wherein the composite material has a porosity suitable for bony ingrowth.

49. The implant of claim 47, wherein the first material is selected from the group consisting of silica and alumina, and mixtures thereof.

50. The implant of claim 47, wherein the second material comprises titania.

51. A biomedical implant comprising:

a photocatalytic surface; and

a light source adapted to irradiate the photocatalytic surface;

wherein the light source and the photocatalytic surface are configured such that the irradiation of the photocatalytic surface with the light source produce a photocatalytic effect.

52. A photocatalytic system comprising:

an implant having a photocatalytic surface; and

an external light source adapted to irradiate the photocatalytic surface of the implant.

53. A method of treating a prosthetic implant, comprising the acts of;

implanting an implant having a photocatalytic surface into a patient; and

irradiating the photocatalytic surface to produce a photocatalytic effect within the patient.

54. A prosthetic vertebral endplate comprising:

a first surface adapted to mate with a vertebral body;

a second surface comprising an articulation surface suitable for supporting articulation motion;

a body portion connecting the first and second surfaces; and

a titanium dioxide (TiO2) surface.

55. A prosthetic vertebral endplate comprising:

a first surface adapted to mate with a vertebral body;

a second surface comprising a substantially central articulation surface suitable for supporting articulation motion, the articulation surface defining first and second lateral portions of the endplate; and

a functional unit located adjacent one of the first and second lateral portions of the endplate.

56. The endplate of claim 55, wherein the functional unit is an energy delivery device.

57. The endplate of claim 56, wherein the energy delivery device delivers light.

58. The endplate of claim 56, wherein the energy delivery device delivers near UV light.

59. A method of performing a procedure upon a patient, comprising the acts of:

providing a cylinder comprising an outer surface having a photocatalytic layer;

advancing the cylinder through a tissue of the patient, and

irradiating the photocatalytic layer of the cylinder so that at least a portion of the irradiated photocatalytic layer is in contact with the tissue.

60. The method of claim 59, wherein the act of irradiating is sufficient to produce a photocatalytic reaction to produce reactive oxygen species.

61. The method of claim 60, wherein the act of advancing comprises advancing the cylinder through a dermal layer.

62. The method of claim 61, wherein the act of advancing causes microbes present within the dermal layer to contact and attach to the cylinder.

63. The method of claim 61, wherein the act of advancing causes microbes present within the dermal layer to contact and attach to the photocatalytic layer.

64. The method of claim 63, wherein at least a portion of the microbes are *Staph epidermis*.

65. The method of claim 62, wherein the act of irradiating is sufficient to produce the reactive oxygen species in an amount effective to kill a least a portion of the microbes.

66. The method of claim 59, wherein the act of providing the cylinder comprises providing a cannula having open proximal and distal ends.

67. The method of claim 59, wherein the act of providing the cylinder comprises providing a dilator having a closed distal end.

68. A annulus for penetrating a tissue of a patient, the annulus comprising:
a base material forming an outer surface of the annulus;
a distal end portion of the annulus adapted to penetrate tissue;
an elongated intermediate portion of the annulus;
a proximal portion of the annulus; and
a photocatalytic layer disposed upon at least a portion of the outer surface of the base material.

69. The cylinder of claim 68, wherein the distal end portion is essentially closed and is adapted to penetrate tissue.

70. The cylinder of claim 69, further comprising an elongate inner barrel having an opening at the proximal end portion of the cylinder.

71. The cylinder of claim 68, further comprising having an elongate inner barrel having an opening at each of the proximal end portion and distal end portion of the cylinder.

72. The cylinder of claim 68, further comprising:
an inner barrel; and
a light source disposed within the inner barrel.

73. The cylinder of claim 68, wherein the photocatalytic layer is disposed upon at least a portion of the distal end portion of the cylinder.

74. The cylinder of claim 68, wherein the photocatalytic layer is disposed upon at least a portion of the intermediate portion of the cylinder.

75. The cylinder of claim 68, wherein the base material is made of a UV transmissive material.

76. The cylinder of claim 68 wherein the photocatalytic layer comprises titania.

77. The cylinder of claim 68, further comprising:
a fluid transmission channel that enters the cylinder at the proximal end portion of the cylinder surface and exits along the intermediate portion of the cylinder at the outer surface.

78. The cylinder of claim 77, wherein the fluid transmission channel contains hydrogen peroxide.

79. A sterilization system comprising:
an annulus for penetrating a tissue of a patient, the annulus comprising:
a distal end portion of the annulus adapted to penetrate tissue;
an elongated intermediate portion of the annulus;
a proximal portion of the annulus;
a base material forming an outer surface of the annulus, and
a photocatalytic layer disposed upon at least a portion of the base material at the outer surface of the annulus, and
a light transmission device coupled to the proximal end portion of the annulus.

80. The system of claim 79, wherein the light transmission device comprises:
a disc portion having a lower face adapted to seat upon the proximal end of the cylinder;
a light port adapted for connecting to a light source to receive light, and
at least one fiber optic cable extending from the light port to the lower face of the disc portion.

81. The system of claim 80, wherein the photocatalytic layer comprises titania.

82. The system of claim 79, wherein the cylinder includes an elongate inner barrel opening at each of the proximal end portion and distal end portion of the cylinder.

83. A method of disinfecting skin of a patient, comprising the steps of:

providing a substrate comprising a photocatalytic layer;

contacting the photocatalytic layer with a liquid comprising oxygen;

irradiating the photocatalytic layer of the substrate in contact with the liquid to produce reactive oxygen species, and

contacting the reactive oxygen species with the skin of the patient.

84. The method of claim 83, wherein the act of contacting the reactive oxygen species with the skin is sufficient to cause the reactive oxygen species to contact microbes present within the skin.

85. The method of claim 84, wherein the act of contacting the reactive oxygen species comprises contacting at least a portion of microbes that are *Staph epidermis*.

86. The method of claim 84, wherein the act of irradiating the photocatalytic layer and contacting the reactive species with the skin are sufficient to cause the reactive oxygen species to be present in an amount effective to kill a least a portion of the microbes.

87. The method of claim 83, wherein the act of providing the substrate comprises providing a light source capable of initiating photocatalysis upon the photocatalytic layer.

88. The method of claim 87, wherein the act of providing the substrate further comprises providing a wave guide disposed between the light source and the photocatalytic layer.

89. The method of claim 88, wherein the act of providing the substrate further includes providing a reflective layer disposed upon a surface of the wave guide.

90. The method of claim 83, wherein the act of providing the substrate further includes providing a reservoir of liquid comprising oxygen.

91. The method of claim 90, wherein the act of providing the substrate further comprises providing the reservoir in fluid connection with the photocatalytic layer.

92. A shunt device comprising a structural component housed within a tubing, wherein the tubing comprises:

an outer tube having an outer wall and an inner wall;

a photocatalytic layer attached to the inner wall of the outer tube; and

a light port.

93. The shunt of claim 92, wherein the outer tube comprises silicone.

94. The shunt of claim 92, wherein the structural component comprises:

a baseplate having a first surface; and

a photocatalytic layer disposed upon a first portion of the first surface of the baseplate.

95. The shunt of claim 94, wherein the structural component further comprises a valve component disposed upon a second portion of the first surface of the baseplate.

96. The shunt of claim 92, wherein the inner photocatalytic layer comprises titania.

97. The shunt of claim 92, adapted to be hydrocephalus shunt.

98. A shunt device comprising a structural component housed within a tubing, wherein the structural component comprises:

a baseplate having a first surface; and

a photocatalytic layer disposed upon a first portion of the first surface of the baseplate.

99. The shunt of claim 98, wherein the structural component further comprises a valve component disposed upon a second portion of the first surface of the baseplate.

100. The shunt of claim 98, wherein the photocatalytic layer comprises titania.

101. A method of performing a procedure upon a patient, comprising the steps of:

providing a shunt comprising a tubing having an inner surface and a structural component housed within the tubing, wherein at least one of the structural component and the inner surface of the tubing has a photocatalytic layer disposed thereon,

implanting the shunt in the patient, and

irradiating the photocatalytic layer.

102. The method of claim 101, wherein the act of irradiating is sufficient to produce reactive oxygen species.

103. The method of claim 102, wherein the act of irradiating is sufficient to produce the reactive oxygen species in an amount effective kill or destroy a biofilm present on a surface of the shunt.

104. The method of claim 101, wherein the act of providing comprises providing the structural component with a photocatalytic layer disposed thereon.

105. The method of claim 101, wherein the act of providing comprises providing the inner surface of the tubing with a photocatalytic layer disposed thereon.

106. The method of claim 101, wherein the act of irradiating the photocatalytic layer includes introducing a light source into the shunt.

107. The method of claim 101, wherein the act of providing the photocatalytic layer comprises providing the photocatalytic layer comprising doped titania including a dopant.

108. The method of claim 107, wherein the act of providing the titania comprises providing the dopant comprising nitrogen.

109. The method of claim 107, wherein the act of irradiating the photocatalytic layer comprises irradiating it transcutaneously with light having a mean wavelength of at least 600 nm.

110. The method of claim 109, wherein the act of implanting comprises implanting the shunt in the patient at a depth of no more than about 4 mm.

111. An infusion set comprising:

a needle housing having a proximal port, a distal port and a base surface;

a mounting pad coupled to the base surface of the needle housing and having a transverse hole; and

a transcutaneous cannula having a proximal end connected to the distal port of the needle housing and a distal end that is adapted to be fed through the transverse hole;

wherein the transcutaneous cannula comprises:

an inner silicon tube having an outer wall and an inner wall,

an outer photocatalytic layer attached to the outer wall of the silicon tube.